National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB ID: DCA00MA080A	Aircraft Registration Number: N27944
Occurrence Date: 08/09/2000	Most Critical Injury: Fatal
Occurrence Type: Accident	Investigated By: NTSB

Location/Time

Nearest City/Place	State	Zip Code	Local Time	Time Zone	
BURLINGTON TWP.	NJ	06016	0752	EDT	

Airport Proximity: Off Airport/Airstrip	Distance From Landing Facility:	Direction From Airport:

Aircraft Information Summary

Aircraft Manufacturer	Model/Series	Type of Aircraft
Piper	PA-31 NAVAJO	Airplane

Sightseeing Flight: No Air Medical Transport Flight: No

Narrative

Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:

HISTORY OF FLIGHT

On August 9, 2000, at 0752 eastern daylight time (all times in this brief are eastern daylight time based on a 24-hour clock), a Piper PA-31-350 Navajo Chieftain, N27944, operated by Patuxent Airways, Inc., and a Piper PA-44-180 Seminole, N2225G, operated by Hortman Aviation Services, Inc., collided in flight over Burlington Township, New Jersey. The captain, first officer, and seven passengers aboard the Chieftain were killed, as were the flight instructor and the certificated private pilot aboard the Seminole. Both airplanes were destroyed. The Chieftain was operating under 14 Code of Federal Regulations (CFR) Part 135 as a visual flight rules (VFR) charter flight for Department of the Navy personnel. The Seminole was operating under 14 CFR Part 91 as a local, multiengine airplane instructional flight. Day visual meteorological conditions existed at the time of the collision.

The Chieftain was en route from Trenton Mercer County Airport (TTN), Trenton, New Jersey, to Naval Air Station Patuxent River, Maryland. TTN air traffic control cleared the Chieftain for takeoff at 0746. At 0748, the tower controller cleared the crew to change to radio frequency 123.8 MHz (a Philadelphia Approach Control frequency), which the crew acknowledged. No further transmissions were heard from the airplane on any frequency. Impact and fire damage prevented investigators from determining the radio frequencies that had been selected by the Chieftain crew.

The Seminole departed Northeast Philadelphia Airport (PNE), Philadelphia, Pennsylvania, under VFR, from runway 24, at 0745. (PNE is located 14.5 nautical miles [nm] southwest of TTN.) Shortly after takeoff, the tower controller stated, "two five golf frequency change approved," and a crewmember responded, "two five golf." No further transmissions were heard from the airplane on any frequency. Investigators found that the Seminole's radio transmitter had been set to the COMM 2 ("communications radio 2") position. The COMM 1 switch was in the ON position, and the frequency was set to 121.70. The COMM 2 switch was in the TEST position, and the frequency was set to 126.90. PNE's ground control frequency was 121.70, and the tower frequency was 126.90.

According to airport personnel who talked to the Seminole's instructor pilot before takeoff, no practice instrument flight was to be accomplished. The president of Hortman Aviation stated that radar advisories were not normally requested during training flights. He also stated that company aircraft were supposed to fly with strobe lights on at all times. When advised that the Seminole was flying between 130 and 135 knots' airspeed when the accident occurred, the president stated that the airplane would not have been doing maneuvers at that time because that airspeed was too high.

The recorded radar data indicate that shortly before the collision, the Seminole was flying generally northeast, and the Chieftain was flying generally south. Both airplanes were flying at about 3,000 feet. About a minute before the collision, the Seminole started a gradual left turn

Narrative (Continued)

toward the north-northeast. The last secondary radar return before the collision was received from the Seminole at 0752:37.68 at an altitude of 3,000 feet, less than .4 nm southwest of the Chieftain's last radar return. The only returns received after 0752:37.68 in the area surrounding the collision were primary returns that began to appear at 0752:42.35, near the last secondary returns associated with the Chieftain and Seminole. The loss of secondary returns and the appearance of a cloud of primary returns are consistent with loss of power to the transponders and the breakup of the two airplanes following the collision.

PILOT INFORMATION

The Chieftain Captain

The Chieftain captain held an airline transport pilot certificate with ratings for multiengine land airplanes and single-engine land airplanes. His latest Federal Aviation Administration (FAA) second-class medical certificate had no limitations and was dated February 11, 1999. According to Patuxent Airways' records, the captain had 3,968 hours of flight time, 3,651 hours of multiengine flight time, and 1,418 hours of flight time in Piper Navajo Chieftains. He had 122 hours of flight time in the previous 90 days, 21 hours in the previous 30 days, and no flight time in the previous 24 hours. His last flight before the accident flight was on July 19, 2000.

The captain successfully completed an "Airman Competency/Proficiency Check, FAR [Federal Aviation Regulation] 135" in a PA-31-350, on February 13, 2000. He was designated as Patuxent Airways' chief pilot in November 1998. In a June 13, 2000, letter from the FAA, the captain was also designated as a "Proficiency Check Pilot - Aircraft" and a "Line Check Pilot - All Seats," effective May 24, 2000.

According to peers and employers, the captain was a good pilot. Interviews with his wife revealed no personal problems or rest anomalies.

The Chieftain First Officer

The first officer was a certificated commercial pilot with ratings in multiengine land airplanes, single-engine land airplanes, and single-engine seaplanes. He was also certified as a flight instructor and instrument instructor in both multiengine and single-engine airplanes. His latest FAA first-class medical certificate had no limitations and was dated April 21, 2000. According to Patuxent Airways' records and a multiengine flight time estimate, the first officer had 2,185 hours of flight time, 700 hours of multiengine time, and 298 hours in Piper Navajo Chieftains. The first officer had 110 hours of flight time in the previous 90 days, 38 hours in the previous 30 days, and no flight time in the previous 24 hours. His last flight before the accident flight was on August 4, 2000. The first officer successfully completed an "Airman Competency/Proficiency Check, FAR 135" in a PA-31-350, on January 27, 2000.

The first officer's employer stated that he had not flown with the first officer, who had flown almost exclusively with the accident captain. Interviews with first officer's parents revealed no personal problems or rest anomalies.

The Seminole Flight Instructor

The flight instructor was certified as a flight instructor and instrument instructor in both multiengine and single-engine land airplanes. He had been a flight instructor for about 10 years and had received his rating as a multiengine flight instructor on March 23, 2000. He also held a commercial pilot certificate for multiengine and single-engine land airplanes. The flight instructor's latest FAA second-class medical certificate, dated July 3, 2000, required that he wear corrective lenses. The flight instructor's last logbook entry was for a flight on July 13, 2000. As of that date, he had 1,442 hours of flight time, 60 hours of multiengine flight time, and 773

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB ID: DCA00MA080A

Occurrence Date: 08/09/2000

Occurrence Type: Accident

Narrative (Continued)

hours of flight time as a flight instructor, with 3 of those hours in multiengine airplanes.

His employer stated that everyone liked the way in which the flight instructor taught, and that he did not think the flight instructor ever had a student who failed a checkride. Interviews with the instructor's wife revealed no personal problems or rest anomalies.

The Seminole Pilot Receiving Instruction

The pilot receiving multiengine flight instruction was a certificated private pilot, rated in single-engine land airplanes. His latest second-class medical certificate, dated August 20, 1998, required that he wear contact lenses for distance vision. He had 187 hours of flight time, with 12 hours in multiengine airplanes. He had 52 hours of flight time in the previous 90 days, 8 hours in the previous 30 days, and no flight time in the previous 24 hours. This was not the student pilot's first multiengine flight.

The private pilot was described as "a low-key guy who knew what he wanted," "a real good student," and "conscientious." An interview with his mother revealed no personal problems or rest anomalies.

AIRPLANE INFORMATION

Chieftain Description and Maintenance History

The Chieftain was a twin-engine, retractable landing gear, multipurpose airplane with counter-rotating propellers. The cabin accommodated up to eight passengers.

The last annual inspection was conducted January 12, 2000. The last 100-hour inspection was conducted July 14, 2000. The altimeter was calibrated to 20,000 feet on April 30, 1999, and the last static system check was accomplished on April 30, 1999. Examination of maintenance documents revealed that the airplane complied with all appropriate airworthiness directives. No anomalies were noted in the maintenance records.

Seminole Description and Maintenance History

The Seminole was a twin-engine, retractable landing gear aircraft with counter-rotating propellers. It could carry up to four occupants.

The last annual inspection was conducted April 28, 2000. The last 100-hour inspection was conducted July 11, 2000. The altimeter was calibrated to 20,000 feet, and the last static system check was accomplished on March 28, 1997. Examination of maintenance documents revealed that the airplane complied with all appropriate airworthiness directives.

The last transponder test and inspection was also conducted on March 28, 1997. This test and inspection are required by 14 CFR 91.413(a) within the previous 24 months if the airplane is flown in class A, class B, and class C airspace or below 10,000 feet within 30 nm of Philadelphia International Airport (PHL) [see 14 CFR 91.215(b)(1) and (2)].

METEOROLOGICAL INFORMATION

PNE, which is located approximately 9 miles west of the accident location, is the facility nearest the accident site that is capable of recording local weather observations. PNE is equipped with an unaugmented automated surface observing system (ASOS). The weather observation nearest the time of the accident was as follows: time, 0754; type [aviation routine weather report], METAR; wind, 240 degrees at 5 knots; visibility, 10 miles; present weather, none; sky condition, overcast 8,000 feet; temperature, 25 degrees Celsius; dew point, 21 degrees Celsius; altimeter setting, 29.94 inches hg [of mercury].

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: DCA00MA080A

Occurrence Date: 08/09/2000

Occurrence Type: Accident

Narrative (Continued)

AIRPORT INFORMATION

Accident Area Airspace

The accident occurred in class E (uncontrolled) airspace. About 5 nm south of the accident site, low-altitude VFR airspace funnels into a "corridor" between the class B airspace and an alert area. Specifically, PHL class B airspace extends about 7 nm southwest of the accident site; its 15-mile ring has a floor of 3,000 feet mean sea level. McGuire Air Force Base Alert Area A-220 is located about 5 nm east of the accident site. The VFR corridor, which runs northeast to southwest, is about 4 nm wide and 12 miles long.

Trenton Departure Considerations - Patuxent Airways

A former captain for Patuxent Airways stated that company flights departed TTN many times under VFR to avoid delays in receiving departure clearances. The former captain stated further that instrument flight rules flight routing typically added another 50 to 70 miles to the trip and subjected flights to additional radar vectors to accommodate traffic arriving at and departing from PHL. He also noted that VFR advisories were normally difficult to get because they were available on a "workload permitting" basis, and usually, only a north-sector controller and a south-sector controller were on duty in the early morning.

WRECKAGE DISTRIBUTION

The wreckage was spread between two main debris fields. The wreckage path began with the collocation of the outboard section of the Seminole's right wing and the Chieftain's rudder trim tab and ended with the Chieftain's right engine. Most of the Seminole wreckage was spread out in a soybean field located in Florence, New Jersey, and most of the Chieftain wreckage was located in the attached garage of a residential home in Burlington, New Jersey. Postcrash fire destroyed most of the Chieftain wreckage.

AIRWORTHINESS EXAMINATION

Both airplane engines exhibited evidence that their propellers were turning at the time they collided. The Seminole wreckage had at least five blade strikes, and the Chieftain wreckage had two. From the blade strike angles and the compression damage to the Seminole's left wing, investigators determined that the angle of impact was 135 degrees, consistent with the southerly track of the Chieftain and the north-northeasterly track of the Seminole, with the Seminole being slightly above the Chieftain. Neither airplane displayed evidence consistent with an in-flight fire, bird strike, or structural or mechanical failure.

MEDICAL AND PATHOLOGICAL INFORMATION

Toxicological testing for each of the pilots was performed by the FAA Toxicology and Accident Research Laboratory in Oklahoma City, Oklahoma. Concerning the private pilot who was operating the Seminole, 0.301 (ug/ml, ug/g) doxylamine was detected in kidney tissue, and 0.544 (ug/ml, ug/g) doxylamine and an undetermined amount of pseudoephedrine was detected in liver tissue. (Doxylamine is a sedating over-the-counter antihistamine, used in many sleep aids and in many multisymptom nighttime cold relievers. Pseudoephedrine is a common decongestant used in many over-the-counter cold and allergy preparations. It is used in some of the same multisymptom preparations as doxylamine.) The amount of blood available was insufficient for further analysis of the medications. No other tested drugs or ethanol were present in the tissue samples tested from the Seminole pilot. All tested tissue samples and fluids from the other three pilots involved in this collision were negative for tested drugs and ethanol. Tests for carbon monoxide and cyanide were not performed because suitable specimens were not available.

National Transportation Safety Board

FACTUAL REPORT
AVIATION

NTSB ID: DCA00MA080A

Occurrence Date: 08/09/2000

Occurrence Type: Accident

Narrative (Continued)

COMPANY INFORMATION

Patuxent Airways, Inc.

According to a Department of the Air Force, Headquarters Air Mobility Command, biennial survey, conducted on February 17 and 18, 2000, Patuxent Airways, Inc., began operations as a Part 135, on-demand air carrier in 1989. Approximately 90 percent of Patuxent's charter flights were conducted in support of a Department of Defense (DoD) contract. The company, located in Hollywood, Maryland, operated four Navajo Chieftains under the terms of the contract.

Most flight operations were split between the Patuxent River area and the Naval Air Engineering Station at Lakehurst, New Jersey, with approximately 40 percent of the flights initiated from Lakehurst. The accident airplane and crew were based at Lakehurst, but flight operations brought them to company headquarters about three times per week.

At the time of the survey, the company employed six captains and four first officers. Captains had an average experience level of 3,700 hours of flight time, and first officers, 1,500 hours of flight time.

Results of the survey revealed that the company met or exceeded all standards for "continued participation in the DoD Air Transportation Program."

Hortman Aviation Services, Inc.

Hortman Aviation Services, Inc., located at PNE, was founded in the early 1940s. The company operated as a FAR Part 141/61 flight school, offering flight training that ranged from private pilot licenses through airline transport pilot certifications. The company also operated a maintenance department and airplane rental service. The Hortman Aviation fleet consisted of 32 airplanes. The company also provided air charter services.

TESTS AND RESEARCH

A partial cockpit visibility study using stereo photographs from a Chieftain cockpit was performed to determine if the cockpit structure would have blocked the pilot's and copilot's view. The study revealed that the Seminole would have been visible to the pilots in the Chieftain for at least the 60 seconds before the collision. No stereo photographs from a Seminole cockpit were available to determine precise obstruction angles. However, because of the relative viewing angle, the Chieftain would have been visible to the pilots in the Seminole for most of the last 60 seconds. The study further revealed that about 4 seconds before impact, or about .11 nm separation, the angular width of each airplane in each pilot's field of vision would have been approximately 0.5 to 0.6 degrees or about 1/4 inch apparent size at the windscreen.

ADDITIONAL INFORMATION

Radar Traffic Information Service

According to the Aeronautical Information Manual (AIM), paragraph 4-1-14,

Pilots receiving this service [radar traffic information] are advised of any radar display which may be in such proximity to the position of their aircraft or its intended route of flight that it warrants their attention. This service is not intended to relieve the pilot of the responsibility for continual vigilance to see and avoid other aircraft. Many factors, such as limitations of the radar, volume of traffic, controller workload and communications frequency congestion, could prevent the controller from providing this service.

National Transportation Safety Board

FACTUAL REPORT

AVIATION

NTSB ID: DCA00MA080A

Occurrence Date: 08/09/2000

Occurrence Type: Accident

Narrative (Continued)

See and Avoid Responsibilities

According to the AIM, paragraph 5-5-8, "When meteorological conditions permit, regardless of type of flight plan or whether or not under control of a radar facility, the pilot is responsible to see and avoid other traffic, terrain, or obstacles."

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB ID: DCA00MA080A

Occurrence Date: 08/09/2000

Occurrence Type: Accident

Landing Facility/Approach Information

Airport Name	Airport ID:	Airport Elevation	Runway Used	Runway Length	Runway Width
		Ft. MSL	0		

Runway Surface Type: Unknown

Runway Surface Condition: Unknown

Type Instrument Approach: Unknown

VFR Approach/Landing: Unknown

Aircraft Information

Aircraft Manufacturer	Model/Series	Serial Number
Piper	PA-31 NAVAJO	

Airworthiness Certificate(s): Normal

Landing Gear Type: Retractable - Tricycle

Homebuilt Aircraft?	Number of Seats:	Certified Max Gross Wt.	Number of Engines:
No	10	7000 LBS	2

Engine Type:	Engine Manufacturer:	Model/Series:	Rated Power:
Unknown			

- Aircraft Inspection Information

Type of Last Inspection	Date of Last Inspection	Time Since Last Inspection	Airframe Total Time
100 Hour	07/2000	Hours	Hours

- Emergency Locator Transmitter (ELT) Information

ELT Installed?	ELT Operated?	ELT Aided in Locating Accident Site?

Owner/Operator Information

Registered Aircraft Owner	Street Address		
Patuxent Airways, Inc.	PO Box 40		
	City: Hollywood	State: MD	Zip Code: 20636

Operator of Aircraft	Street Address		
PATUXENT AIRWAYS, INC	PO BOX 40		
	City: HOLLYWOOD	State: MD	Zip Code: 20636

Operator Does Business As:

Operator Designator Code:

- Type of U.S. Certificate(s) Held:

Air Carrier Operating Certificate(s): On-demand Air Taxi

Operating Certificate:

Operator Certificate:

Regulation Flight Conducted Under: Part 135: Air Taxi & Commuter

Type of Flight Operation Conducted: Non-scheduled; Domestic; Passenger Only

National Transportation Safety Board

FACTUAL REPORT AVIATION

NTSB ID: DCA00MA080A

Occurrence Date: 08/09/2000

Occurrence Type: Accident

First Pilot Information

Name	City	State	Date of Birth	Age

Sex: M | Seat Occupied: Unknown | Principal Profession: Unknown | Certificate Number:

Certificate(s): Airline Transport

Airplane Rating(s): Multi-engine Land; Single-engine Land

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): None

Type Rating/Endorsement for Accident/Incident Aircraft? Yes | Current Biennial Flight Review?

Medical Cert.: Class 2 | Medical Cert. Status: Valid Medical--no waivers/lim. | Date of Last Medical Exam: 02/1999

- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Mult-Engine	Night	Instrument Actual	Instrument Simulated	Rotorcraft	Glider	Lighter Than Air
Total Time	3968	1418		3651						
Pilot In Command(PIC)										
Instructor										
Last 90 Days	122									
Last 30 Days	21									
Last 24 Hours	0									

Seatbelt Used? | Shoulder Harness Used? | Toxicology Performed? Yes | Second Pilot?

Flight Plan/Itinerary

Type of Flight Plan Filed: IFR

Departure Point	State	Airport Identifier	Departure Time	Time Zone
TRENTON	NJ	TTN	0746	EDT

Destination	State	Airport Identifier
PATUXENT	MD	NHK

Type of Clearance: VFR

Type of Airspace: Class E

Weather Information

Source of Briefing: National Weather Service

Method of Briefing: Unknown

National Transportation Safety Board

FACTUAL REPORT AVIATION

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Occurrence Date: 08/09/2000

Occurrence Type: Accident

Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
KTTN	0753	EDT	0 Ft. MSL	0 NM	0 Deg. Mag.

Sky/Lowest Cloud Condition: Unknown Ft. AGL

Condition of Light: Not Reported

Lowest Ceiling: Unknown Ft. AGL

Visibility: 0 SM

Altimeter: 29.93 "Hg

Temperature: 23 °C

Dew Point: 22 °C

Wind Direction: 190

Density Altitude: Ft.

Wind Speed: 4

Gusts:

Weather Condtions at Accident Site: Visual Conditions

Visibility (RVR): 0 Ft.

Visibility (RVV) 0 SM

Intensity of Precipitation:

Restrictions to Visibility:

Type of Precipitation: None

Accident Information

Aircraft Damage: Destroyed

Aircraft Fire: None

Aircraft Explosion None

Classification: U.S. Registered/U.S. Soil

- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot	1				1
Second Pilot	1				1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers	7				7
- TOTAL ABOARD -	9				9
Other Ground	0	0	0		0
- GRAND TOTAL -	9	0	0		9

National Transportation Safety Board

FACTUAL REPORT

AVIATION

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Administrative Information

Investigator-In-Charge (IIC)

ROBERT P. BENZON

Additional Persons Participating in This Accident/Incident Investigation:

FLOYD A JAMES
ASI
FAA
AAI-100,
Washington, DC 20593